REMARKS

In the Office Action, the Examiner first rejected Claims 1, 6, 9-13 and 15-30 under 35 U.S.C. §102(e) as being anticipated by Scherer et al. (U.S. Patent No. 6,534,798) (hereinafter "Scherer et al."). Additionally, the Examiner rejected Claims 2-5 and 7-8 under 35 U.S.C. §103(a) as being unpatentable over Scherer et al. Reconsideration of these rejections is respectfully requested.

The present claimed invention is directed to an optical structure for processing optical energy comprising a metal layer having a plurality of voids with a dimension less than the wavelength of optical energy being processed, an active or non-linear material adjacent at least a portion of the metal layer in the area of the voids, wherein the voids exhibit localized resonances, and a substrate for supporting the metal layer. Dependent claims recite that the invention comprises voids being cylindrical holes passing through the metal layer and that the voids are in a triangular array. Applicant respectfully submits that these features are not disclosed or suggested by the Scherer et al. reference.

Notwithstanding the comments of the Examiner, applicant urges that the Scherer et al. reference does not disclose or suggest the voids having a dimension less than the wavelength of the optical energy being processed, that localized surface plasma resonances will be exhibited or the use of cylindrical voids in a triangular arrary, as presently claimed.

With respect to the failure of Scherer et al. to disclose or suggest voids with a dimension less than the wavelength of the optical energy to be processed, applicant previously stated that Scherer et al. describes processing 986 or 930 nm light (col. 10, lines 13-15) from the semiconductor. Since the optical energy for processing at the metal layer comprises modes having a strong confinement in the semiconductor, the wavelength of the mode is predominantly defined by the refractive index of the semiconductor when the interaction occurs. As such, the wavelength must be divided by the refractive index of the semiconductor, which is about 3.5 for the GaAs of the semiconductor membrane (986nm/3.5 or 930nm/3.5). The wavelength of the optical energy being processed at the voids in Scherer et al. is, therefore, about 280 or 265 nm,

respectively. See Declaration of Howard Roy Stuart, attached hereto, at paragraphs 1-5.

In his comments the Examiner disagreed, stating, "applicant's argument about the optical energy for processing at the metal layer is form [sic] the semiconductor is not corrected [sic]." However, even a cursory reading of Scherer et al. makes clear that the optical energy is indeed from the semiconductor on which the metal layer is deposited, and that the reference is in fact all about processing optical energy emitted from the semiconductor layer.

For example, Scherer et al. states, *inter alia*, that "the invention is an improvement in a light emitting diode **comprising an active light emitting semiconductor layer** having a first and second parallel surface..." (col. 1, lines 57-63), "**the active light emitting semiconductor layer** comprises a semiconductor membrane..." (col. 2, lines 6-8), "**[t]he light emitting semiconductor layer** in combination with the an [sic] optically reflecting layer and the an [sic] optically reflecting grating..." (col. 2, lines 12-15), "[t]he invention can also be defined as an improved light emitting diode **comprising an active light emitting semiconductor layer** having a first and second..." (col. 2, lines 18-24), "[s]till further the invention is defined as a method of improving emission from a light emitting diode comprising the steps of **providing an active light emitting semiconductor layer** having..." (col. 2, lines 29-32) and "[t]he semiconductor emitter layer of the light-emitting diode is thinner than $\lambda/2$ and is sandwiched between two metal films" (col. 4, lines 27-29).

All of these references to Scherer et al. clearly demonstrate that the optical energy being processed is from the semiconductor layer. Moreover, because the optical energy is from the semiconductor layer, the wavelength is divided by the refractive index of the semiconductor, as set forth above.

Wherein Scherer et al. calls for holes having a radius of 210nm, i.e., a dimension of 420 nm (col. 14, lines 4-6) and the wavelength of the optical energy from the semiconductor being processed is about 265 to 280 nm (986nm/3.5 or 930nm/3.5), the dimension of the voids in Scherer et al. is not less than the wavelength of the optical energy being processed, as presently claimed. As such, Scherer et al. fails to disclose or suggest the present claimed invention.

As for the second point raised by the Examiner in response to applicant's arguments, the Examiner cited col. 9, lines 55-57 of Scherer et al. to show that the reference discloses localized resonance. However, the citation relied upon by the Examiner from the Scherer et al. reference does not call for **localized** resonance that enhance emission and absorption of optical energy through the first material.

Rather, a closer reading of the Examiner's citation from the Scherer et al. reference states that there is a resonance in the cavity that "is radiated out of the cavity through the spacing between stripes." This radiation out of the cavity through the one-dimensional grating of Scherer et al. interacts with a propagating wave, a teaching away from the localized resonance presently claimed by applicant herein. See Declaration of Howard Roy Stuart, attached hereto, at paragraph 6.

Moreover, whether or not Scherer et al. states that resonance occurs in the void itself is irrelevant, due to the physical confines of the voids themselves. It is beyond the voids that is significant, where the present invention claims localized resonance not available using the one-dimensional grating of Scherer et al.

As such, the Scherer et al. reference fails to anticipate or render obvious the present claimed invention wherein it does not disclose or suggest a localized resonance.

Finally, the Examiner stated that the claimed voids being cylindrical and in a triangle array would have been obvious because of the applicant's disclosure on page 10, where applicant indicates that by choosing the geometry of the pattern and spacing of the voids lasing wavelength and modal characteristics of a device can be controlled. However, the Examiner is improperly **relying on applicant's own disclosure** for his rejection.

As applicant previously argued, the Scherer et al. reference does disclose or suggest the use of cylindrical voids in a triangular array as claimed by applicant at Claims 4, 5, 7 and 8. Scherer et al. specifically calls for a cup shaped void with a diameter of 420 nm (210 nm radius), not a cylinder passing through the metal layer as in Claims 4 and 5, without any suggestion of a cylinder as the configuration of the hole. Moreover, Scherer et al. only refers to a square array of holes, without any mention whatsoever of a triangular array as presently claimed (see, col. 13, line 66-col. 14, line 6). Thus, the claimed elements are more than a rearrangement of parts. As such, Scherer et al cannot support the rejection of Claims 4, 5, 7 and 8 under §103(a).

Presumably recognizing this, the Examiner bases the obviousness of these claims on applicant's own disclosure. Of course, rejection of the claims over the very specification that describes the elements is not proper. The fact that **applicant recognized that different geometries and arrays has an effect on the device and particularly claimed an ordered triangular array using cylindrical voids** is not the proper basis for a rejection. The Examiner cannot use the teachings of applicant to reject applicant's own claims.

If an Examiner could reject a claim over the teachings in the specification, no patent could possibly issue, since the support in the specification would render obvious the claims. Notwithstanding, this is exactly what is being done in this rejection. Since the cited reference makes no mention of using the cylindrical geometry and triangular array claimed by applicant, reliance on the applicant's own teaching cannot overcome this deficiency.

Based on the foregoing, applicant respectfully submits that the Scherer et al. reference does not anticipate or render obvious the present claimed invention, and the pending claims are patentable thereover. Favorable consideration and allowance the pending claims is therefore respectfully requested and earnestly solicited.

Respectfully submitted,

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